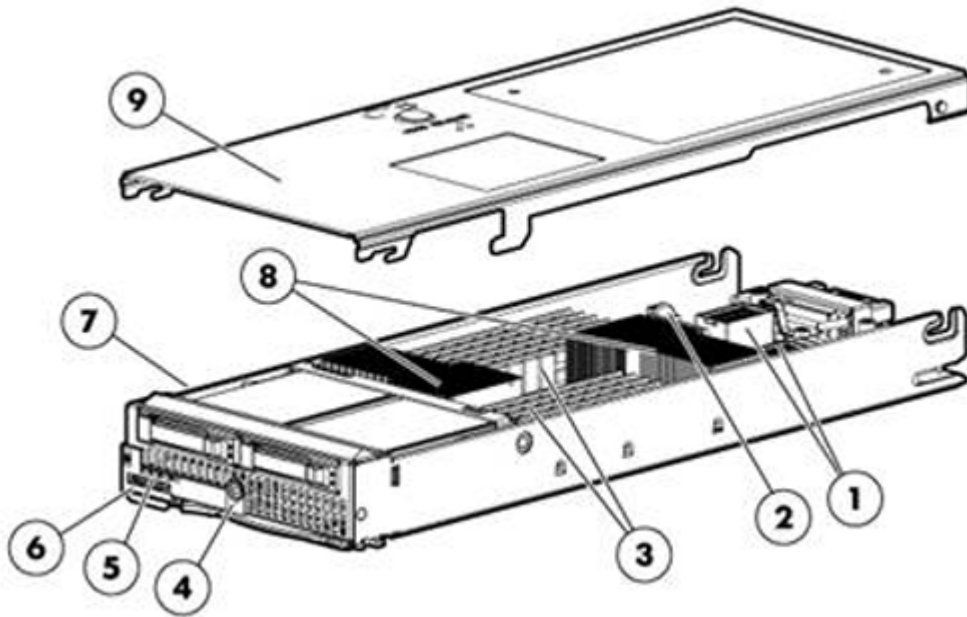


Overview



HP ProLiant BL460c G7 Server Blade

- | | |
|--|--|
| 1. Two (2) mezzanine I/O expansion slots | 5. Two (2) small form factor (SFF) hot-plug drive bays |
| 2. Internal USB connector | 6. Local I/O Connector |
| 3. Twelve (12) DDR3 Registered or Unbuffered DIMM Memory Slots | 7. Internal SD card slot |
| 4. HP Smart Array P410i Controller (under drive bays) | 8. Up to two (2) Intel® Xeon® 5500 or 5600 series processors |
| | 9. Access Panel |

What's New

- Support for new HP 300GB 6G SAS 15K 2.5" Enterprise Hard Disk Drive

At A Glance

This document covers the HP ProLiant BL460c G7 server blade only. For more information on HP BladeSystems c-Class Enclosures and HP BladeSystem c-Class Interconnect and Mezzanine Components, please see the following:

HP BladeSystem c-Class Enclosures QuickSpecs:

HP BladeSystem c3000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html

HP BladeSystem c7000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html



Overview

HP BladeSystem c-Class Interconnect and Mezzanine Components:

<http://h18004.www1.hp.com/products/ blades/ components/ c-class-interconnects.html>

<http://h18004.www1.hp.com/products/ blades/ components/ c-class-adapters.html>

The HP ProLiant BL460c G7 provides greater 2P x86 server blade density without compromise and maximum power-efficiency with flexibility and choice.

HP ProLiant BL460c G7 server blade includes:

- **Processor:**
 - Up to two (2) Intel® Xeon® 5500 or 5600 series processors
 - Intel® 5520 Chipset
- **Memory:**
 - Twelve (12) DIMM slots
 - Up to 384GB, using PC3-10600 DDR3 registered (RDIMM) memory, operating at 800MHz when fully populated at 2 DIMMs per channel in 12 slots
 - Up to 48GB, using PC3-10600 DDR3 unbuffered (UDIMM) memory, operating at 1333MHz when fully populated at 2 DIMMs per channel in 12 slots
- **Storage Controller:**
 - HP Smart Array P410i Controller with no cache supporting RAID 0 and 1
- **Internal Drive Support:**
 - Two (2) hot-plug small form factor (SFF) drive bays
 - Support for SAS, SATA, and SSD hot-plug hard drives
- **Network Controller:**
 - Integrated NC553i Dual Port FlexFabric 10Gb Adapter supporting autosensing 10Gb/1Gb Ethernet, FCoE, Flex-10, TCP/IP offload engine, hardware-based accelerated iSCSI, and iSCSI boot.
NOTE: Fibre Channel over Ethernet (FCoE) capability requires the use of an HP Virtual Connect FlexFabric 10Gb/24-port Module or HP 10GbE Pass-Thru Module. Learn more at: www.hp.com/go/virtualconnect.
NOTE: Each port is autosensing 1 Gb/10 Gb, and can interoperate with 1 Gb HP BladeSystem c-Class interconnect components. Both ports will operate at the same speed.
 - One (1) additional 10/100 server adapter dedicated to iLO 3 Management
- **Mezzanine Support:**
 - Two (2) I/O expansion mezzanine slots
 - Supports up to two (2) mezzanine cards
 - Dual-port FlexFabric adapter mezzanine options
 - Dual-port Fibre Channel mezzanine (4 Gb or 8 Gb) options for SAN connectivity
 - Multi-port 1Gb and 10Gb Ethernet server adapter mezzanine options for additional network ports
 - InfiniBand (IB) mezzanine options for low latency and high bandwidth server interconnectivity
 - I/O accelerator mezzanine options for high transaction rate local storage
 - Smart Array SAS RAID controller mezzanine options for external direct attach and shared SAS storage
- **Expansion Blade Support:**
 - Supports one (1) optional storage, tape, or PCI expansion blade
- **Internal Media Support:**
 - One (1) internal USB 2.0 connector for USB flash media drive keys
 - One (1) internal secure digital (SD) card slot
- **Trusted Platform Module:**
 - One (1) internal TPM 1.2 module connector
- **Form Factor:**
 - HP ProLiant BL460c G7 is a half-height server blade that plugs into the HP BladeSystem c3000 and c7000 enclosures
- **Infrastructure Management:**
 - This server blade requires the latest version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For information on the latest firmware versions, please see the Blades



Overview

Firmware Maintenance website at: <http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html>

- HP Integrated Lights-Out 3 (iLO 3) management processor for simplified server setup, health monitoring and recovery, power and thermal control, and lights-out remote administration.
- HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, control and optimize your IT infrastructure through a single, simple management console. Insight Control supports both Windows and Linux-based central management servers.
- HP Insight Dynamics for ProLiant, a product option, is an integrated command center that enables IT Staff personnel to continuously analyze and optimize a converged infrastructure, while automating and reducing the cost of common data center tasks by as much as 40 percent. This ultimately enables them to dynamically keep pace with the organization's changing business requirements.
- **Operating Systems and Virtualization Software:**
 - Supports Windows, RHEL, SLES, Oracle Solaris, VMware, and Citrix XenServer

NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Operating System Support Matrix at: <http://www.hp.com/go/ossupport> and the BL460c G7 driver download page.
- **Enclosures:**
 - HP offers two different c-Class server blade enclosures to meet your individual needs:
 - The HP BladeSystem c7000 rack enclosure is 10U high and holds up to sixteen (16) ProLiant BL460c G7 servers plugged vertically.
 - The HP BladeSystem c3000 rack enclosure is 6U high and holds up to eight (8) HP ProLiant BL460c G7 servers plugged horizontally.
 - Server blades, storage blades, interconnect modules, power supplies, fans, and redundant Onboard Administrator modules are all designed to fit into the c3000 and c7000 enclosures.
 - For additional enclosure information, please see: <http://h18004.www1.hp.com/products/blades/components/enclosures/c-class/index.html>.
- **Warranty:**
 - This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Certain restrictions and exclusions apply. Hard drives have either a one year or three year warranty; refer to specific hard drive QuickSpecs for details.

NOTE: Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>



Standard Features

Processor

One of the following
depending on Model

Six-Core Processors

Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

Intel® Xeon® Processor X5670 (2.93GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

Intel® Xeon® Processor X5660 (2.80GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

Intel® Xeon® Processor X5650 (2.66GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

Intel® Xeon® Processor E5649 (2.53GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/1/1/2/2) Processor

Intel® Xeon® Processor E5645 (2.40GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/1/1/2/2) Processor

Intel® Xeon® Processor L5640 (2.26GHz/6-core/12MB/60W, DDR3-1333, HT, Turbo 2/2/3/3/4/4) Processor

Four-Core Processors

Intel® Xeon® Processor X5672 (3.20GHz/4-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

Intel® Xeon® Processor X5667 (3.06GHz/4-core/12MB/95W, DDR3-1333, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® Processor L5630 (2.13GHz/4-core/12MB/40W, DDR3-1066, HT, Turbo 1/1/2/2)

Intel® Xeon® Processor L5520 (2.26GHz/4-core/8MB/60W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® Processor E5640 (2.66GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® Processor E5630 (2.53GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® Processor E5620 (2.40GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® Processor E5607 (2.26GHz/4-core/8MB/80W, DDR3-1066) Processor

Intel® Xeon® Processor E5506 (2.13GHz/4-core/4MB/80W, DDR3-800) Processor

Two-Core Processors

Intel® Xeon® Processor E5503 (2.0GHz/2-core/4MB/80W, DDR3-800) Processor

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency increment when using Intel® Turbo Boost Technology, with 4, 3, 2, and 1 cores active (on four-core processors) or with 6, 5, 4, 3, 2, and 1 cores active (on six-core processors).

NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: For the Intel Xeon 5500 and 5600 Series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream); and "L" denotes Lower Wattage.

Upgradeability

Upgradeable to two (2) processors



Standard Features

Cache Memory	4MB shared L3 cache
One of the following depending on Model	8MB shared L3 cache
	12MB shared L3 cache

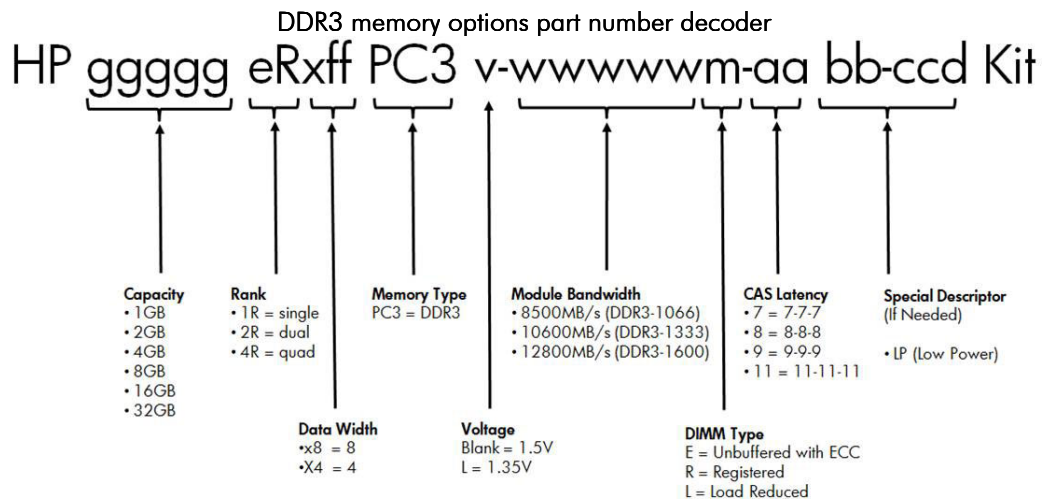
Chipset	Intel® 5520 Chipset
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Memory	Type	DDR3 Registered (RDIMM) or Unbuffered (UDIMM)
	Standard	6 GB (3 x 2GB) RDIMM
	Maximum (RDIMM)	384GB (12 x 32 GB) for registered memory configurations
	Maximum (UDIMM)	48 GB (12 x 4 GB) for unbuffered memory configurations

NOTE: A minimum of 2GB of memory must be installed.

NOTE: Depending on the memory configuration and processor model the memory speed may operate at 1333MHz, 1066MHz or 800MHz. Please see the Online Memory Configuration Tool for details:

www.hp.com/go/ddr3memory-configurator.



Memory Protection	Advanced ECC (multi-bit error protection)
	Memory Mirroring Mode
	Memory Lock-Step Mode
	Memory Online Spare Mode supported on Intel Xeon 5600 Series processors

Network Controller	Integrated NC553i Dual Port FlexFabric 10Gb Adapter
	NOTE: FlexFabric capability requires the use of an HP Virtual Connect FlexFabric module or HP 10GbE Pass-Thru Module. Learn more at: www.hp.com/go/virtualconnect .
	One (1) additional 10/100 NIC dedicated to iLO 3 Management

I/O Expansion Slots	Two (2) I/O expansion mezzanine slots (x8 PCI Express)
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Standard Features

Integrated Manageability HP Integrated Lights-Out 3 (iLO 3) management processor

Storage Controller Type HP Smart Array P410i Controller with no cache supporting RAID 0 and 1
Available Options: 256MB cache, 1G and 512MB Flash Backed Write Cache (FBWC), and Smart Array Advanced Pack.
NOTE: Supports two (2) small form factor (SFF) hot plug drive bays.

Maximum Internal Storage <i>One of the following depending on Model</i>	Hot-plug SAS	2.0TB	2 x 1.0TB drives
	Hot-plug SATA	2.0TB	2 x 1.0TB drives
	Hot-plug SAS SSD	1.6TB	2 x 800GB drives
	Hot-plug SATA SSD	800GB	2 x 400GB drives

Graphics Integrated Matrox G200
Resolution Color Depths 1600 x 1200, 64K, 256, 16
1280 x 1024, 16.7M, 64k, 256, 16
1024 x 768, 16.7M, 64k, 256, 16
800 x 600, 16.7M, 64k, 256, 16
640 x 480, 16.7M, 64k, 256, 16
NOTE: Maximum resolution available via HP Integrated Lights-Out 3 (iLO 3) remote console is 1280 x 1024.

Fibre Channel Support Two (2) optional Fibre Channel HBAs are supported by the HP ProLiant BL460c G7. Both mezzanine circuit boards connect directly to the server blade system board. These Fibre Channel HBAs are available via option kits and must be ordered separately.

HBA mezzanine card option kits:

Emulex LPe1105 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem (403621-B21)

- Based on the same field-proven ASIC, firmware, and driver technology as Emulex's renowned LPe1150 HBA, the Emulex LPe1105-HP is fully driver compatible with all Emulex HBAs

Emulex LPe1205 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem (456972-B21)

- Exceptional performance, enhanced security, and scalable management for virtual server and enterprise-class applications

QLogic QMH2462 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem (403619-B21)

- Uses common drivers which means that customers can standardize on one QLogic driver whether they are using the QMH2462 or other HBAs powered by QLogic

QLogic QMH2562 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem (451871-B21)

- Provides a first step into the 8Gb future, advanced, embedded support for virtualized environments and reduced power consumption



Standard Features

HP BLc Brocade 804 8Gb Fibre Channel Host Bus Adapter (590647-B21)

- Application oriented quality of service (AQoS) providing the ability to configure, prioritize, and optimize traffic flows from virtual machines and/or applications to the target port

Brocade, Emulex and QLogic Fibre Channel HBAs for HP BladeSystem c-Class feature:

- Optimal performance utilizing PCI Express
- 4/2/1Gb/s auto negotiating speeds (4Gb HBAs)
- 8/4/2Gb/s auto negotiation speeds (8Gb HBAs)
- Dual-ports for redundant path connections
- Up to two Fibre Channel (FC) HBAs per server blade providing redundant FC HBA support
- Optimized for HP Storage products and supported by third party SAN vendors
- Support for Microsoft® Windows® and Linux operating system environments

Compatible SAN

HP ProLiant BL460c G7 server blades are optimized for HP MSA, EVA and XP.

HP ProLiant BL460c G7 server blades are compatible with select 3rd party SANs (please see blade storage page for more details: <http://h18004.www1.hp.com/products/blades/components/c-class-sans.html>)

HP Virtual Connect

HP Virtual Connect is an interconnect option for BladeSystem c-Class that simplifies server connectivity to data and storage networks, and reduces costs. Unique HP Flex-10 and FlexFabric technologies make maximum use of network bandwidths, provide dynamic tuning and enable extreme flexibility to meet individual server and infrastructure requirements. HP Virtual Connect Enterprise Manager (VCEM) provides a central console to administer network connections and workloads for thousands of servers. For more information on Virtual Connect Ethernet, Fibre Channel, Converged Network and management options see: www.hp.com/go/virtualconnect

HP Insight management software

HP Service Pack for ProLiant

HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) version 5 provide a new, comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling firmware to be updated online and integrating firmware and system software updates in one operation HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire BladeSystem enclosures. Further improving system uptime and stability is the fact that HP provides 12 months of support on each Service Pack for ProLiant.

The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM version 5 and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application has been re-written to provide a more straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also



Standard Features

available in reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and the SPP will recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline.

The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdependencies, when determining the correct updates and order of update deployment.

The Service Pack for ProLiant (which includes HP SUM 5) can be downloaded from www.hp.com/go/spp/download. More information can be found: www.hp.com/go/spp and <http://www.hp.com/go/hpsum>

HP Insight Foundation

Insight Foundation is being baselined at version v8.70 which means the following:

- Its Media Kit (contains 2 SmartStart CDs, the Firmware DVD, and the Management DVD) will continue to ship with all supported ProLiant G7 or earlier BTO servers until the last supported server is no longer shipping.
- The Media Kit will not be updated past version 8.70.
- ProLiant G7 or earlier CTO servers are able to order the Media Kit with the understanding that the media is not updated. Please check specific server QuickSpecs for availability of CTO Kit.
- PSP and Firmware DVD downloads will be updated through 2Q 2012 at the HP Insight Foundation Suite for ProLiant downloads tab: <http://www.hp.com/go/foundation>

Customers are urged to use the replacement product, HP Service Pack for ProLiant, instead of Insight Foundation Suite which is found at these location:

- www.hp.com/go/spp
- www.hp.com/go/spp/download

HP Integrated Lights-Out (iLO)

HP Integrated Lights-Out (iLO) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP iLO functions without additional software and can be accessed from any location via a web browser. HP iLO works hand-in-hand with HP Systems Insight Manager, Insight Control suites, and Insight Dynamics for ProLiant, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service. For more information, visit: www.hp.com/go/iLO

HP Insight Control

HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console.



Standard Features

Two versions of Insight Control are available, to serve environments requiring either a Linux-based or a Windows-based central management server: HP Insight Control for Linux, and HP Insight Control. See www.hp.com/go/insightcontrol

HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: <http://www.hp.com/services/insight>.

HP Insight Dynamics for ProLiant

HP Insight Dynamics for ProLiant, a product option, is advanced infrastructure management software that enables IT staff to instantly adjust their environments to meet dynamic business demands by provisioning, optimizing and protecting complex infrastructure in minutes. It's a powerful toolkit, integrated-by-design, that accelerates complex technology projects and simplifies daily operations, transforming data center economics. With Insight Dynamics IT professionals can plan capacity and power continuously, balance workloads across physical and virtual resources, and ensure cost-effective high availability. It also enables IT organizations to provision infrastructure consistently and automatically from pools of shared resources using a self-service portal. Resources provisioned can range from a single virtual machine to complex multi-tier environments and their associated physical and virtual resource requirements. In addition to the previous functional benefits, it also provides a cost-effective disaster recovery for physical and virtual environments that works with HP Continuous Access software for both the Enterprise Virtual Array and the XP storage array allowing application environments to be reactivated in minutes with the touch of a button to a remote location.

NOTE: For more information, visit: <http://www.hp.com/go/insightdynamics>

High Performance Clusters

HP Cluster Platforms

HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. <http://www.hp.com/go/clusters>

HP HPC Interconnects

High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. <http://www.hp.com/techservers/clusters/ucp/index.html>

HP Insight Cluster Management Utility

HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. <http://www.hp.com/go/cmu>



Standard Features

HP HPC Linux Value Pack HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported option to HP Insight CMU, for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform LSF workload scheduler and Platform Application Center, as well as the HP-MPI parallelization library. [HP HPC Linux Value Pack](#)

Operating Systems and Virtualization Software Support for ProLiant Servers

[Microsoft Windows Server](#)
[Red Hat Enterprise Linux \(RHEL\)](#)
[SUSE Linux Enterprise Server \(SLES\)](#)
[Oracle Solaris](#)
[VMware](#)
[Citrix XenServer](#)

NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <http://www.hp.com/go/ossupport> and our driver download page <http://www.hp.com/support/BL460cG7>

Availability

- Dual-Port Fibre Channel Mezzanine Card options for redundant SAN connection
- Dual-port embedded 10 Gigabit Ethernet adapters for redundant LAN connections
- Two (2) hot-plug SAS/SATA hard drive bays and integrated RAID (HP Smart Array P410i Controller)
- Optional Battery-backed and Flash-backed write cache module for integrated RAID controller
- Redundant ROM
- Advanced ECC Memory
- Support for Memory Mirroring Mode and Memory Lock-Step Mode
- Support for Memory Online Spare Mode with Xeon 5600 Series processors
- Network adapter teaming (network fault tolerance, transmit load balancing, switch-assisted load balancing)

Industry Standard Compliance

ACPI 2.0 Compliant
PCI 2.2 Compliant
WOL Support
Microsoft® Logo certifications
USB 2.0 Support
IMPI 2.0 Compliant
SMASH CLP Compliant



Standard Features

Security

- Power-on password
- Administrator's password
- Keyboard password (QuickLock)
- Integrated Lights-Out 3 with:
 - 12 customizable user accounts
 - SSL encryption
 - Secure Shell version 2
 - Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface
 - AES and RC4 encryption of video
 - Disable via a global setting
- Keyboard password
- External USB port enable/disable
- Network server mode
- Serial interface control
- TPM (Trusted Platform Module) 1.2 option
- Intel® Advanced Encryption Standard-New Instructions (AES-NI) (Intel Xeon 5600 series processors)

Security - Trusted Platform Module The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline.

NOTE: For more information about TPM, including a white paper, go to: <http://www.hp.com/go/TPM>

NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.

NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services on your specific server model please contact your sales representative or go to: <http://www.hp.com/go/factory-express.html>



Standard Features

HP Enterprise Configurator

The HP e-Configure Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance. <http://www.hp.com/products/configurator>



Service and Support

Service and Support

HP Technology Services for Industry Standard Servers and BladeSystem

Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

What HP ProLiant and BladeSystem Services can do for you

HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs.

HP Technology Services meets business challenges with services offered in three packages - Optimized Care Package, Standard Care Package, and Basic Care Package - available for each product group. Such packaged solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support packages for servers, storage, networking and software.

Optimized Care Package Supports maintaining servers at optimum performance availability

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure

Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, PMP and VPM

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf>

3-Year HP Critical Advantage L3 for c3000/c7000 enclosure + 3-Year HP Critical Advantage L3 for Blade server

Provides end-to-end infrastructure support solution for business critical applications running on virtualized/x86 infrastructures, enabling the customers to cost effectively build, operate, and continuously improve their IT environment

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA3-1772ENW.pdf>

HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network

HP Provides for the configuration and testing of BladeSystem Ethernet interconnect switches to facilitate proper implementation of network protocols and access to advanced features.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf>

Additional Services: Virtualization Services - Strategy, Design, Transition, Operation, Continual Service Improvement.



Service and Support

Standard Care Package Package that maintains high level of server availability

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure

Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, PMP and VPM

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf>

HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network

HP Provides for the configuration and testing of BladeSystem Ethernet interconnect switches to facilitate proper implementation of network protocols and access to advanced features

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf>

3-Year, HP 6 hour Hardware Support Onsite Call-to-Repair Service for c3000/c7000 enclosure + 3-Year, HP 6 hour Hardware Support Onsite Call-to-Repair Service for Blade server

Provides an IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 hours of the initial service request to the HP Global Solution Center

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf>

3-Year , HP 24x7 Software Support for Insight Control

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf>

1-Year HP Proactive Select 30 Credit

Provides a flexible way to purchase HP best-in-class consultancy and technical services

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-3842ENN.pdf>

Additional Services: Software OS (Microsoft, Linux (SUSE/Red Hat) & VMware Installation & Start Up and Software Support); Microsoft or Linux or VMware education courses; +60 Proactive Select Credits, Factory Express.



Service and Support

Basic Care Package

Delivers minimum recommended support service level

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure

Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, PMP and VPM

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf>

3-Year, HP 24x7 4 hour Response, Hardware Support Onsite Service for c3000/c7000 enclosure + 3-Year, HP 24x7 4 hour Response, Hardware Support Onsite Service for Blade server

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf>

3-Year , HP 24x7 Software Support for Insight Control

Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf>

1-Year HP Proactive Select 10 Credit

Provides a flexible way to purchase HP best-in-class consultancy and technical services

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-3842ENN.pdf>

Additional Services: Startup Blade System c-Class Enhanced Network Service; Software OS (Microsoft, Linux (SUSE/Red Hat) & VMware Installation & Start Up and Software Support); +30 Proactive Select Credits, Factory Express

Insight Remote Support

The packages include HP Insight Remote Support that uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnoses, and problem resolution. It is available at no additional cost to all warranty, HP Care Pack Service, and service agreement customers.

For more information

To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: www.hp.com/services/bladeSystem



Models

Models

HP ProLiant BL460c G7
X5675 1P 12GB-R Server
637390-B21

Processor(s)
[One of the following
depending on Model](#)

HP ProLiant BL460c G7
X5670 1P 12GB-R P410i
Server
603251-B21

HP ProLiant BL460c G7
X5650 1P 6GB-R P410i
Server
603259-B21

HP ProLiant BL460c G7
E5649 1P 6GB-R Server
637391-B21

HP ProLiant BL460c G7
E5640 1P 6GB-R P410i
Server
603569-B21

Cache Memory

Memory
[One of the following
depending on Model](#)

HP ProLiant BL460c G7
E5620 1P 6GB-R P410i
Server
603588-B21

Network Adapter

HP ProLiant BL460c G7
E5506 1P 6GB-R P410i
Server
603591-B21

Storage Controller

HP ProLiant BL460c G7
L5640 1P 12GB-L P410i
Server
603256-B21

Hard Drives

Internal Storage

Optical Drive

Form Factor

(1) Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor
(1) Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor
(1) Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor
(1) Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/1/1/2/2) Processor
(1) Intel® Xeon® E5640 (2.66GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor
(1) Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor
(1) Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W, DDR3-800) Processor
(1) Intel® Xeon® L5640 (2.26GHz/6-core/12MB/60W, DDR3-1333, HT, Turbo 2/2/3/3/4/4) Processor

4MB or 12MB shared L3 cache

12 GB (3 x 4 GB) PC3-10600 (DDR3-1333) Registered DIMMs
6 GB (3 x 2 GB) PC3-10600 (DDR3-1333) Registered DIMMs
12GB (3 x 4 GB) PC3L-10600 (DDR3-1333) Low Voltage Registered DIMMs

Embedded NC553i Dual Port FlexFabric 10Gb Adapter and one (1) additional 10/100 server adapter dedicated to iLO 3 Management

HP Smart Array P410i Controller with no cache supporting RAID 0 and 1

None ship standard

Two hot plug SFF drive bays

None

Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure
Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure



Smart Buys

HP BL460c G7 X5650 2P 16GB-R US Svr/S-Buy 630442-S01	Processor(s)	(2) HP BL460c G7 X5650 (2.66 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)
	Memory	16GB (2x 8GB PC3-10600 (DDR3-1333) Registered CAS-9)
	Network Adapter	Embedded NC553i Dual Port FlexFabric 10Gb Converged Network Adapter supporting stateless TCP/IP offload, TCP Offload Engine (TOE), Fibre Channel over Ethernet (FCoE) and iSCSI protocols
	Storage Controller	HP Smart Array P410i/ZM Controller (RAID 0/1)
	Hard Drives	None included, supports up to two (2) small form factor (SFF) SAS or SATA hot plug hard disk drives
	Form Factor	Half-height server blade
<hr/>		
HP BL460c G7 E5649 12G 1P Svr/S-Buy 644568-S01	Processor(s)	(1) Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W)
	Memory	12GB (3x 4GB PC3-10600 (DDR3-1333) Registered CAS-9)
	Network Adapter	Embedded NC553i Dual Port FlexFabric 10Gb Converged Network Adapter supporting stateless TCP/IP offload, TCP Offload Engine (TOE), Fibre Channel over Ethernet (FCoE) and iSCSI protocols
	Storage Controller	HP Smart Array P410i/ZM Controller (RAID 0/1)
	Hard Drives	None included, supports up to two (2) small form factor (SFF) SAS or SATA hot plug hard disk drives
	Form Factor	Half-height server blade



Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.

NOTE: HP does not allow factory integration of options into standard models listed above.

Configure-to-order server blades must start with a CTO Blade.

NOTE: FIO indicates that this option is a Factory Installable Option.

Step 1: Base Server Blade Configuration (Select a configurable Blade)

Models	HP ProLiant BL460c G7 Configure-to-order Server	603718-B21
	Configurable Model ships with:	
	Integrated NC553i Dual Port FlexFabric 10Gb Adapter and one (1) additional 10/100 server adapter dedicated to iLO 3 management	
	Smart Array P410i Controller with no cache supporting RAID 0 and 1	
	Integrated Lights-Out 3 Standard Blade Edition	

Step 2: Choose Required Options (one of the following from each list unless otherwise noted)

HP Processors	For single processor configuration choose:	
	Six-Core Processor Option Kits	
	NOTE: If two processors are desired, select one xxxxx-L21 and one xxxxx-B21.	
	HP BL460c G7 Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W) FIO Processor Kit	637406-L21
	HP BL460c G7 Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W) FIO Processor Kit	610859-L21
	HP BL460c G7 Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W) FIO Processor Kit	603254-L21
	HP BL460c G7 Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W) FIO Processor Kit	610860-L21
	HP BL460c G7 Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W) FIO Processor Kit	637410-L21
	HP BL460c G7 Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W) FIO Processor Kit	637412-L21
	HP BL460c G7 Intel® Xeon® L5640 (2.26GHz/6-core/12MB/60W) FIO Processor Kit	610863-L21
	Four-Core Processor Option Kits	
	HP BL460c G7 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W) FIO Processor Kit	637408-L21
	HP BL460c G7 Intel® Xeon® X5667 (3.06GHz/4-core/12MB/95W) FIO Processor Kit	626902-L21
	HP BL460c G7 Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W) FIO Processor Kit	603574-L21
	HP BL460c G7 Intel® Xeon® L5520 (2.26GHz/4-core/8MB/60W) FIO Processor Option Kit	641568-L21
	HP BL460c G7 Intel® Xeon® E5640 (2.66GHz/4-core/12MB/80W) FIO Processor Kit	610861-L21



Configuration Information - Factory Integrated Models

HP Memory

HP BL460c G7 Intel® Xeon® E5630 (2.53GHz/4-core/12MB/80W) FIO Processor Kit	610862-L21
HP BL460c G7 Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W) FIO Processor Kit	612127-L21
HP BL460c G7 Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W) FIO Processor Kit	610864-L21
HP BL460c G7 Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W) FIO Processor Kit	637414-L21
Two-Core Processor Option Kits	
HP BL460c G7 Intel® Xeon® E5503 (2.0GHz/2-core/4MB/80W) FIO Processor Kit	612890-L21
Registered DIMMs (RDIMMs)	
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21
HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit	627814-B21
Unbuffered with ECC DIMMs (UDIMMs)	
HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: PC3L is low voltage memory.



Configuration Information - Factory Integrated Models

Step 3: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below. For additional options, including server blade enclosures interconnect, mezzanine options and power subsystem options; please see the Core Options and Additional sections below; or the following:

HP BladeSystem c-Class Enclosures QuickSpecs:

HP BladeSystem c3000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html

HP BladeSystem c7000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html

and HP BladeSystem c-Class Interconnect and Mezzanine Components:

<http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html>

<http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html>



Core Options

HP Ethernet Mezzanine Options

Gigabit Ethernet Mezzanines

HP NC325m PCI Express Quad Port Gigabit Server Adapter 416585-B21

NOTE: If the NC325m is installed in mezzanine slot 1 of a half-height server, connectivity will be provided on 2 of the 4 ports.

HP NC364m Quad Port 1GbE BL-c Adapter 447883-B21

NOTE: If the NC364m is installed in mezzanine slot 1 of a half-height server, connectivity will be provided on only 2 of the 4 ports.

HP NC382m PCI Express Dual Port Multifunction Gigabit Server Adapter 453246-B21

NOTE: The Gigabit Ethernet adapters above transmit from the server at 2000 Mbps, full duplex per port only. For more information, see the "Network Controller" segment in the Standards Features section.

10 Gigabit Ethernet Mezzanines

NOTE: A 10 Gigabit Ethernet adapter is required for each server blade connecting to a 10Gb interconnect in bays 3-8 (HP BladeSystem c7000 Enclosure) or bays 2-4 (HP BladeSystem c3000 Enclosure).

NOTE: Each 10 Gigabit Ethernet adapter requires a minimum of 2GB of server memory.

NOTE: Each 10 Gigabit Ethernet adapter supports linking at 1000Mbps or 10000Mbps when not connected to a Flex-10 enabled module and will link with all current 1Gb switches at 1Gb.

NOTE: The ROM Based Setup Utility (RBSU) feature allows for the configuring of a FlexFabric Adapter to any of the supported protocols. For example iSCSI to FCoE (Fibre Channel over Ethernet). Note that a HP Virtual Connect profile takes precedence over the setting in this menu. Also, some FlexFabric Adapters may require that network boot be enabled in order to configure the protocol. If the protocol is configured without enabling network boot with certain FlexFabric Adapters, the protocol may not take effect. Once the protocol has taken effect on the first boot after configuring this option, network boot may be disabled if desired.

HP NC532m Dual Port 10GbE Multifunction BL-c Adapter 467799-B21

HP NC542m Dual Port Flex-10 10GbE BL-c Adapter 539857-B21

HP NC552m 10Gb 2-port Flex-10 Ethernet Adapter 610609-B21

HP NC553m 10Gb 2-port FlexFabric Adapter 613431-B21

HP Fiber Channel Mezzanine Options

HP BLc Brocade 804 8Gb Fibre Channel Host Bus Adapter 590647-B21

Emulex LPe1205 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem 456972-B21

Emulex LPe1105 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem 403621-B21

QLogic QMH2562 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem 451871-B21

QLogic QMH2462 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem 403619-B21



Core Options

HP Processors

Six-Core Processor Option Kits

HP BL460c G7 Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W) Processor Kit	637406-B21
HP BL460c G7 Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W) Processor Kit	610859-B21
HP BL460c G7 Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W) Processor Kit	603254-B21
HP BL460c G7 Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W) Processor Kit	610860-B21
HP BL460c G7 Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W) Processor Kit	637410-B21
HP BL460c G7 Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W) Processor Kit	637412-B21
HP BL460c G7 Intel® Xeon® L5640 (2.26GHz/6-core/12MB/60W) Processor Kit	610863-B21

Four-Core Processor Option Kits

HP BL460c G7 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W) Processor Kit	637408-B21
HP BL460c G7 Intel® Xeon® X5667 (3.06GHz/4-core/12MB/95W) Processor Kit	626902-B21
HP BL460c G7 Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W) Processor Kit	603574-B21
HP BL460c G7 Intel® Xeon® L5520 (2.26GHz/4-core/8MB/60W) Processor Kit	641568-B21
HP BL460c G7 Intel® Xeon® E5640 (2.66GHz/4-core/12MB/80W) Processor Kit	610861-B21
HP BL460c G7 Intel® Xeon® E5630 (2.53GHz/4-core/12MB/80W) Processor Kit	610862-B21
HP BL460c G7 Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W) Processor Kit	612127-B21
HP BL460c G7 Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W) Processor Kit	637414-B21
HP BL460c G7 Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W) Processor Kit	610864-B21

Two-Core Processor Option Kits

HP BL460c G7 Intel® Xeon® E5503 (2.0GHz/2-core/4MB/80W) Processor Kit	612890-B21
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HP Memory

Registered DIMMS (RDIMMs)

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP S-Buy 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-S21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP S-Buy 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-S21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP S-Buy 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-S21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	627812-B21



Core Options

HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
HP S-Buy 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-S21
HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit	627814-B21
Unbuffered with ECC DIMMs (UDIMMs)	
HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
HP S-Buy 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-S21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit S-Buy	500672-S21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <http://h18004.www1.hp.com/products/servers/platforms/energyefficient/>

NOTE: PC3L is a low voltage memory.

HP Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	619291-B21
HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive S-Buy	619291-S21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive S-Buy	581286-S21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
HP S-Buy 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-S21



Core Options

HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3 yr Warranty Hard Drive	627117-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3 yr Warranty Hard Drive S-Buy	627117-S21
HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
HP S-Buy 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-S21
HP S-Buy 146GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507125-S21
HP 72GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512545-B21
SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	605835-B21
HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive S-Buy	605835-S21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507610-B21
NOTE: Please see QuickSpecs for Technical Specifications and additional information:	
http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html	
NOTE: The hard drive options are not required when configuring a Drive-less Model.	
SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 3G SATA 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive	625609-B21
HP 1TB 3G SATA 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive S-Buy	625609-S21
HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21
HP S-Buy 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-S21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information:	
http://h18000.www1.hp.com/products/quickspecs/13121_na/13121_na.html	
SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives	
HP 400GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636597-B21
HP 200GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636595-B21
HP 120GB 3G SATA SFF (2.5-inch) Midline 1yr Warranty Solid State Drive	572073-B21
HP 100GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636593-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information:	
http://h18000.www1.hp.com/products/quickspecs/13145_na/13145_na.html	
6G SAS Hot Plug Enterprise Performance Solid State Drives	
HP 400GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive	632494-B21



Core Options

HP 200GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive	632492-B21
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6G SAS Hot Plug Enterprise Mainstream Solid State Drives

HP 800GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	632506-B21
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HP 400GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	632504-B21
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HP 200GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	632502-B21
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NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13121_ns/13121_na.html



Additional Options

HP Insight software

HP Insight Control

HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License T9074BAE

HP S-Buy Insight Control including 1yr 24x7 Technical Support and Updates Electronic License T9074ASE

HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License 452148-B22

HP S-Buy Insight Control, Single-Server License including 1 year of 24x7 Technical Support and Updates 452148-S22

HP Insight Software Media Kit 436222-B21

NOTE: Insight Software DVD media without licenses. Contains Insight Control, Insight Dynamics and Virtual Connect Enterprise Manager. Uses an integrated installer to perform quick and accurate software installation and updates.

NOTE: Licenses ship without media. The HP Insight Control Media Kit can be ordered separately, or can be downloaded at: <http://www.hp.com/go/insightupdates>.

NOTE: Electronic licenses can be used to purchase multiple licenses with a single activation key.

NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support & Update Service.

NOTE: For additional license kits, including bundles with HP BladeSystem enclosures, please see the Insight Control QuickSpecs at:

http://h18004.www1.hp.com/products/quickspecs/12631_na/12631_na.html

HP Insight Control for Linux

HP Insight Control for Linux including 1yr 24x7 Support Electronic License TC213AAE

HP S-Buy Insight Control for Linux including 1yr 24x7 Support Electronic License TC213ASE

NOTE: This part number can be purchased as a single license or as multiple licenses with a single activation key. Customer will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.

HP Insight Control for Linux including 1yr 24x7 Support Single Server License TC209A

HP Insight Control for Linux Media Kit TC208A

NOTE: This optional Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately.

NOTE: This Media pack is optional because the latest ISO image and latest updates may be downloaded at no cost from: <http://www.hp.com/go/ic-linux> (click on Download button).

NOTE: Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at: <http://www.hp.com/go/ic-linux> (click on Download button).

NOTE: Electronic licenses can be used to purchase multiple licenses with a single activation key.

NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes



Additional Options

one year of 24 x 7 HP Software Technical Support Service.

NOTE: For additional License Kits, including electronic licensing options, please see the QuickSpecs at:

http://h18000.www1.hp.com/products/quickspecs/13019_na/13019_na.html

HP Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem Remote Management

HP iLO Advanced for BladeSystem including 1yr 24x7 Support Electronic License

TA851AAE

HP iLO Advanced for BladeSystem including 1yr 24x7 Support Single Server License

512488-B21

NOTE: Electronic licenses can be used to purchase multiple licenses with a single activation key.

NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.

NOTE: For additional license kits please see the HP Integrated Lights-Out (iLO) QuickSpecs at: www.hp.com/go/iLO.

High Performance Clusters

HP Cluster Management Utility

HP Cluster Management Utility Flexible License

QL803A

NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.

HP Cluster Management Utility Media

433257-B21

NOTE: Order a minimum of one license per cluster to purchase media including software and documentation, which will be delivered to the customer, and also licenses CMU management. No license key is delivered or required.

NOTE: For additional license kits please see the QuickSpecs at:

http://h18004.www1.hp.com/products/quickspecs/12612_na/12612_na.html

HP HPC Linux Value Pack

HP High Performance Computing Linux Value Pack 1 Processor Flexible License

TC293B

NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one socket (a.k.a. processor). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.

HP High Performance Computing Linux Value Pack Media Kit

TC294A

NOTE: This part number can be used to purchase media including software and documentation, which will be delivered to the customer.

NOTE: For additional license kits please see the QuickSpecs at:

http://h18004.www1.hp.com/products/quickspecs/13485_na/13485_na.html

HP Security - TPM

HP Trusted Platform Module Option

488069-B21

NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.



Additional Options

HP Storage Controllers

HP Smart Array P700m Controller

HP Smart Array P700m/512 4-ports Ext PCIe x8 SAS Controller

508226-B21

HP Smart Array P700m/256 4-ports Ext PCIe x8 SAS Controller

507925-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13175_na/13175_na.html

HP Smart Array P711m Controller

HP Smart Array P711m/1G 6Gb FBWC 4-ports Ext Mezzanine SAS Controller

513778-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18004.www1.hp.com/products/quickspecs/14035_na/14035_na.html

HP Smart Array P712M Controller

HP Smart Array P712m/256 6Gb 2-ports Int/2-ports Ext Mezzanine SAS Controller

488348-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13296_na/13296_na.html

Optional Upgrades

HP Smart Array P-Series Low Profile Battery

452348-B21

NOTE: The Smart Array Low Profile Battery supports the HP Smart Array P700m Controller.

NOTE: The Smart Array battery option kit is required to enable battery-backed write cache (BBWC).

NOTE: The options listed below supports the integrated HP Smart Array P410i.

HP 256MB P-series Cache Upgrade

462968-B21

HP 512MB Flash Backed Write Cache

534916-B21

HP 1GB Flash Backed Cache

534562-B21

HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License

516471-B21

NOTE: A license key, a minimum of 256MB cache, and battery kit is required to enable Smart Array Advanced Pack features. For more information go to:

<http://www.hp.com/go/saap>

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13201_na/13201_na.html

HP I/O Expansion Options

HP 320GB IO Accelerator for BladeSystem c-Class

AJ878B

HP 640GB IO Accelerator for BladeSystem c-Class

BK836A

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13220_na/13220_na.html



Additional Options

HP c-Class Mezzanine Options	HP 4X QDR QLogic InfiniBand Dual Port Mezzanine HCA for c-Class BladeSystem	583210-B21
	HP 4X QDR InfiniBand ConnectX-2 Dual Port Mezzanine HCA for c-Class BladeSystem	592519-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12586_na/12586_na.html		
HP Ultrium Tape Blades	HP LTO-4 SB1760c Tape Blade	AQ697A
	NOTE: LTO-4 Ultrium tape technology. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12729_na/12729_na.html	
HP Storage Blades	HP LTO-5 SB3000c Tape Blade	BS580A
	NOTE: Please see the for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/12729_na/12729_na.html	
	HP SB40c Storage Blade	411243-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12587_na/12587_na.html	
	HP D2200sb Storage Blade	AP880A
	NOTE: Please see the HP D2200sb PCIe Storage Blade QuickSpecs for technical specifications and additional information at: http://h18006.www1.hp.com/storage/bladesystem/index.html .	
HP Expansion Blade	HP BLc PCI Expansion Blade	448018-B21
	NOTE: Ships with one pre-installed PCI-X connect board. Also includes one PCIe connect board which requires installation. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12753_na/12753_na.html	



Additional Options

HP USB and SD Options	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP USB Standard Keyboard	DT528A#ABA
	HP 2GB USB Flash Media Drive Key Kit	608447-B21
	NOTE: HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like Smartstart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to HP VMware Getting Started Guide for installation instructions.	
	HP 4GB Secure Digital High Capacity Flash Media Kit	580387-B21
	NOTE: Blank SD media devices are supported for use with VMware and Citrix. SD media must be installed in the internal slot of the ProLiant server. Learn more at: http://www.hp.com/go/proliantvirtualization	

HP Care Pack Services	NOTE: The HP Care Pack service part numbers below for ProLiant BL c-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.	
	Hardware Services On-site Service	
	HP 3 year 4 hour 13x5 BL4xxc Server Blade Hardware Support	UK065E
	HP 3 year 4 hour 24x7 BL4xxc Server Blade Hardware Support	UK066E
	HP 3 year 6 hour 24x7 Call to Repair BL4xxc Server Blade Hardware Support	UK067E
Smart Buy Care Pack Services	NOTE: The HP Care Pack service part numbers below for ProLiant BL c-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.	
	Hardware Services On-site Service	
	S-Buy 4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic	UH959E
	S-Buy 4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UH960E
	S-Buy 6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UM366E
	HP SBuy3y24x7 24hCTRBL4xxc Svr Bld HWSup	HZ765E



Memory

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".

Memory Population Guidelines

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool:

www.hp.com/go/ddr3memory-configurator

Some DIMM installation guidelines are summarized below:

- For the HP ProLiant BL460c G7 server with twelve (12) memory slots:
 - There are three (3) channels per processor; six (6) channels per server
 - There are two (2) DIMM slots for each memory channel; twelve (12) total slots.
 - Memory channel 1 consists of the two (2) DIMMs that are closest to the processor
 - Memory channel 3 consists of the two (2) DIMMs that are furthest from the processor
- DIMM slots that are white should be populated first
- Do not mix unbuffered memory (UDIMMs) with registered memory (RDIMMs).
- Do not install DIMMs if the corresponding processor is not installed
- If only one processor is installed in a two processor system, only half of the DIMM slots are available
- To maximize performance, balance the total memory capacity between all installed processors
- It is not required, but it is recommended to load the channels similarly if possible
- Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
- Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- For memory mirroring mode, channel 3 must be unpopulated. Channels 1 and 2 are populated identically
- For lock-step mode, channel 3 must be unpopulated. DIMMs in channels 1 and 2 will be installed in pairs. The paired slots will be 1,4; 2,5 on the BL460c G7
- Low Voltage DIMMs can only be used with Intel Xeon 5600 series processors.
- If mixing DIMM voltage is a requirement, please note that the DIMMs will run at 1.5V since all 1.35V are capable of supporting 1.5V operations

DIMM slot/capacity/populated speed table										
DIMM Type	Registered DIMMS (RDIMMs)							Unbuffered with ECC DIMMs (UDIMMs)		
	Single Rank (1R)	Dual Rank (2R)				Quad Rank (4R)		Single Rank (1R)	Dual Rank (2R)	
DIMM Rank										
DIMM Capacity	4GB	2GB	4GB	8GB	16GB	16GB	32 GB	1GB	2GB	4GB
DIMM Native Speed (MHz)	1333	1333	1333	1333	1333	1066	1066	1333	1333	1333
DIMM Voltage	LV/Std	Std	Std	LV/Std	LV/Std	Std	LV/Std	Std	Std	Std
SLOTS THAT CAN BE POPULATED										
12 slot servers	12	12	12	12	12	12	12	12	12	12
MAXIMUM CAPACITY (GB)										
	48	24	48	96	192	192	384	12	24	48
POPULATED DIMM SPEED (MHz)										
1 DIMM Per Channel	1333	1333	1333	1333	1333	1066	1066	1333	1333	1333
2 DIMM Per Channel	1066/ 1333	1333	1333	1066/ 1333*	1066/ 1333*	800	800	1333	1333	1333
NOTE: *By default, low voltage (LV) DIMMs will operate at standard voltage (1.5V) and operate at 1333MHz in a 2 DIMM per channel configuration. For power savings, this behavior can be changed in RBSU to operate at low voltage (1.35V) and 1066MHz.										



Memory

NOTES:

- PC3-10600 DIMMs have a maximum speed of 1333MHz.
- PC3-8500 DIMMs have a maximum speed of 1066MHz.
- Mixing DIMM speeds is allowed, but the system processor speed rules always override the DIMM capabilities
- If you do mix DIMM speeds, the memory bus will default to the minimum clock rate of all DIMMs in the system - even if the slower DIMM is on the other processor
- If you install 1x 1066MHz DIMM in channel 1 and 1x 1333MHz DIMM in channel 2, the maximum speed will be 1066MHz
- If you install 1x 1066MHz DIMM in channel 1 and 5x 1333MHz DIMMs with 1 DIMM per channel in each of the other channels, the maximum speed will be 1066MHz
- Maximum memory speed will also depend on the processor installed
- References to the above MHz speeds are for the various speeds of DDR3 DIMMs; 1333 refers to DDR3-1333, etc.

HP ProLiant BL460c G7 Server Blade DIMM slot and configuration diagrams

Basic memory slot and population diagram

- Population order; start with "A" first, "B" second, "C" third, etc.

12 DIMM SLOTS (6 per CPU node)					
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D	1	D	Channel 1
	2	A	2	A	
Channel 2	3	E	3	E	Channel 2
	4	B	4	B	
Channel 3	5	F	5	F	Channel 3
	6	C	6	C	

HP ProLiant BL460c G7 Server Blade (1P Model)

Standard memory configuration (1 CPU model)

- 6GB (3 x 2GB) of PC3-10600 (DDR3-1333) RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D: empty	1	D: empty	Channel 1
	2	A: 2GB DIMM	2	A: empty	
Channel 2	3	E: empty	3	E: empty	Channel 2
	4	B: 2GB DIMM	4	B: empty	
Channel 3	5	F: empty	5	F: empty	Channel 3
	6	C: 2GB DIMM	6	C: empty	

Standard Memory Plus Optional Memory (1 CPU model)

- 30 GB of PC3-10600 (DDR3-1333) RDIMMs (3 x 2GB plus 3 x 8GB)



Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D: 2GB DIMM	1	D: empty	Channel 1
	2	A: 8GB DIMM	2	A: empty	
Channel 2	3	E: 2GB DIMM	3	E: empty	Channel 2
	4	B: 8GB DIMM	4	B: empty	
Channel 3	5	F: 2GB DIMM	5	F: empty	Channel 3
	6	C: 8GB DIMM	6	C: empty	

Standard Memory Replaced with Optional Memory (1 CPU model)

- 96GB of PC3-8500 Quad-Rank RDIMMs (6 x 16GB)

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D: 16GB DIMM	1	D: empty	Channel 1
	2	A: 16GB DIMM	2	A: empty	
Channel 2	3	E: 16GB DIMM	3	E: empty	Channel 2
	4	B: 16GB DIMM	4	B: empty	
Channel 3	5	F: 16GB DIMM	5	F: empty	Channel 3
	6	C: 16GB DIMM	6	C: empty	

UDIMM maximum configuration (1 CPU model)

- 24GB, consisting of six (6) 4GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D: 4GB DIMM	1	D: empty	Channel 1
	2	A: 4GB DIMM	2	A: empty	
Channel 2	3	E: 4GB DIMM	3	E: empty	Channel 2
	4	B: 4GB DIMM	4	B: empty	
Channel 3	5	F: 4GB DIMM	5	F: empty	Channel 3
	6	C: 4GB DIMM	6	C: empty	

Standard Memory Replaced with Optional Memory (2 CPU Model)

RDIMM maximum configuration

- 384GB, consisting of twelve (12) 32GB quad-rank PC3-8500 RDIMMs



Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D: 32GB DIMM	1	D: 32GB DIMM	Channel 1
	2	A: 32GB DIMM	2	A: 32GB DIMM	
Channel 2	3	E: 32GB DIMM	3	E: 32GB DIMM	Channel 2
	4	B: 32GB DIMM	4	B: 32GB DIMM	
Channel 3	5	F: 32GB DIMM	5	F: 32GB DIMM	Channel 3
	6	C: 32GB DIMM	6	C: 32GB DIMM	

UDIMM maximum configuration (2 CPU model)

- 48GB, consisting of twelve (12) 4GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Channel 1	1	D: 4GB DIMM	1	D: 4GB DIMM	Channel 1
	2	A: 4GB DIMM	2	A: 4GB DIMM	
Channel 2	3	E: 4GB DIMM	3	E: 4GB DIMM	Channel 2
	4	B: 4GB DIMM	4	B: 4GB DIMM	
Channel 3	5	F: 4GB DIMM	5	F: 4GB DIMM	Channel 3
	6	C: 4GB DIMM	6	C: 4GB DIMM	

NOTE: Capacity references are rounded to the common Gigabyte values.

- 1GB = 1024MB
- 2GB = 2048MB
- 4GB = 4096MB
- 8GB = 8192MB
- 16GB = 16384MB
- 32GB = 32768MB



Memory

Following are memory options available from HP:

HP Memory

Registered DIMMs (RDIMMs)

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21
HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit	627814-B21

Unbuffered with ECC DIMMs (UDIMMs)

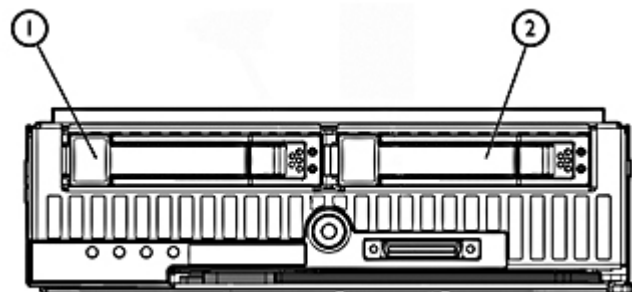
HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: PC3L is a low voltage memory.



Storage



1-2 2 x SFF hot-plug SAS, SATA, SAS SDD, and SATA SSD hard drives

Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
900GB 6G SAS 10K	2	1-2	HP Smart Array P410i Controller
600GB 6G SAS 10K			
450GB 6G SAS 10K			
300GB 6G SAS 10K			
300GB 6G SAS 15K			
146GB 6G SAS 15K			
72GB 6G SAS 15K			

SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 6G SAS 7.2K	2	1-2	HP Smart Array P410i Controller
500GB 3G SAS 7.2K			

SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 3G SATA 7.2K	2	1-2	HP Smart Array P410i Controller
500GB 3G SATA 7.2K			
160GB 3G SATA 7.2K			

SAS Hot Plug Enterprise Performance Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 6G SAS SLC	2	1-2	HP Smart Array P410i Controller
200GB 6G SAS SLC			



Storage

SAS Hot Plug Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller
800GB 6G SAS MLC	2	1-2	HP Smart Array P410i Controller
400GB 6G SAS MLC			
200GB 6G SAS MLC			

SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 3G SATA MLC SFF	2	1-2	HP Smart Array P410i Controller
200GB 3G SATA MLC SFF			
100GB 3G SATA MLC SFF			

External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
Enterprise Virtual Array Systems	Please see the XP Disk Array Systems QuickSpecs below to determine configuration requirements	External	Please see the XP Disk Array Systems Quick Specs for the latest list of supported HBAs

HP Enterprise Virtual Array Family:

http://h18006.www1.hp.com/products/quickspecs/12408_na/12408_na.html



Technical Specifications

System Unit	Dimensions (H x W x D) (with bezel)	7.154 x 2.19 x 20.058 in (18.17 x 5.56 x 50.95 cm)	
	Weight (approximate)	Maximum (all hard drives and processors installed)	16.5 lb (7.5 kg)
		Minimum (one hard drive and processor installed)	11.50 lb (5.22 kg)
	Power Specifications	For power specifications including Input Requirements, BTU Rating, and Power Supply Output, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at URL: HP BladeSystem c3000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html HP BladeSystem c7000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html To review typical system power ratings use the HP BladeSystem Power Sizer which is available via the online tool located at URL: http://www.hp.com/go/bladesystem/powercalculator	
System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.	
	Non-operating	System performance may be reduced if operating with a fan fault or above 30°C (86°F). -30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	
	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.	
Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
	Acoustic Noise	For acoustic noise specifications, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at URL:	



Technical Specifications

HP BladeSystem c3000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html

HP BladeSystem c7000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html

HP Smart Array P410i Controller	Disk Drive Interface	6Gb/s SAS (Serial Attached SCSI) 3Gb/s SATA (Serial ATA)
	Server Interface	x4 PCI Express host interface
	Cache Memory	0 MB (none) standard Optional 256MB, 512MB, or 1GB cache memory
	Logical Drives Supported	2 (with standard 0MB cache)
	Maximum Logical Drive Capacity	32 (with optional 256MB cache) 64 (with optional 512MB cache)
	Host Memory Addressing	64-bit, supporting servers memory space greater than 4 GB
	RAID Support	RAID 1 (Mirroring) RAID 0 (Striping)
	Upgradeable Firmware	Controller: Upgradeable Firmware with Recovery ROM feature Online Drive Flash (with SAS drives) requires 256MB, 512MB, or 1GB cache module
Embedded HP NC553i Dual Port FlexFabric 10Gb Adapter	Type	Integrated dual-port KR 10Gb with FlexFabric (FCoE or iSCSI) capability
	Network Processor	ServerEngines BE3
	Data Transfer Method	x8 PCI Express 2.0
	Network Transfer Rate	Two ports, each at 20 Gbps full duplex; 40 Gbps aggregate full duplex theoretical bandwidth NOTE: Each port is autosensing 1 Gb / 10 Gb, and can interoperate with 1 Gb HP BladeSystem c-Class interconnect components. Both ports will operate at the same speed. NOTE: Each port on the NC553i adapter transmits from the server at 20 Gbps (theoretical) full duplex.
	IEEE Compliance	802.1p QoS, 802.1Q VLAN tagging, 802.3ad link aggregation, 802.3ap 10GBase-KR, and 802.3x flow control
	Standard Features	<ul style="list-style-type: none"> ProLiant Teaming including Network Fault Tolerance, Transmit Load Balancing, and Switch-Assisted Load Balancing 9K Jumbo frames (4K Jumbo frames when in FCoE mode) Microsoft Windows Receive Side Scaling (RSS) Accelerated iSCSI
HP Integrated Lights-Out 3 (iLO 3) integrated on system board	Architecture	PCI Express based health and remote management ASIC
	Processor	PCI Express RISC processor core running at 250MHz
	Upgradeability	Option firmware upgradeable via Flash ROM
	Video Support	1600 x 1200 DVR max resolution



Technical Specifications

Interfaces	One Ethernet Sideband connection (10/100/1000 Mb/s) One Ethernet network connection (10/100Mb/s)
Memory	128 MB DDR with ECC
Operating System Support	Microsoft Windows 2008 R2 Microsoft Windows 2008 (32 bit and 64 bit) Microsoft Windows Server 2008 Standard Edition (32bit and 64bit) Microsoft Windows Server 2008 Enterprise Edition (32bit and 64bit) Microsoft Windows Server 2003 and Windows Server 2003 R2, and Windows Server 2003 for Extended Systems Standard Edition, Enterprise Edition Red Hat Enterprise Linux 5.4 (32 bit and 64 bit) SUSE LINUX Enterprise Server 11 (32bit and 64bit) SUSE LINUX Enterprise Server 10 (32bit and 64bit) VMware ESX 4.0 VMware ESX 3.5.0
Client System Support	Microsoft Windows 7 Microsoft Windows XP Professional Edition Microsoft Windows Vista Business and Ultimate Editions Red Hat Enterprise Desktop 5.00 SUSE Linux Enterprise Desktop 11 SUSE Linux Enterprise Desktop 10
Client Browser Support	Microsoft Internet Explorer 8 Microsoft Internet Explorer 7 Microsoft Internet Explorer 6 Firefox 3.5 (on supported Windows and Linux systems) Firefox 3.0 (on supported Windows and Linux systems)
Command Line Support	Secure Shell and serial port access Secure Socket Layer Secure Shell version 2
Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface AES encryption of video RC4 encryption of video
Directory Support Services	Active Directory v1.0 (Windows 2003)
Driver Support	HP ProLiant iLO3 Management Controller Driver Package
Management protocols supported	SNMP, IPMI 2.0 (system and LAN interface), DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP), HP RIBCL XML



Technical Specifications

Environment-friendly Products and Approach

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <http://www.hp.com/go/green>. To recycle your product, please go to: <http://www.hp.com/go/green> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.

